**SIEMENS**



PATENT
Attorney Docket No. 1999P09028US01

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

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| Inventor: | G. Merrill et al. | Group Art Unit: | 1725 |
| Serial No.: | 10/648,922 | Examiner: | J. Johnson |
| Filed: | August 27, 2003 | | |

Title: HIGH TEMPERATURE EROSION RESISTANT COATING AND MATERIAL CONTAINING COMPACTED HOLLOW GEOMETRIC SHAPES

Commissioner For Patents
PO BOX 1450
Alexandria, VA. 222313-1450

Sir:

APPELLANTS BRIEF

This Appeal Brief relates to an appeal from the final rejection of claims 21-40 in the Office Action mailed April 10, 2006.

## Real Party in Interest

This application is assigned to Siemens Power Generation, Inc. (f/k/a Siemens Westinghouse Power Corporation), a Delaware corporation having a principle place of business in Orlando, Florida. Siemens Power Generation, Inc, is a wholly owned subsidiary of Siemens Corporation of Iselin, New Jersey.

## Related Appeals and Interferences

There are no prior and pending appeals, interferences or judicial proceedings known to Applicants, Applicants' legal representative, or Assignee which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## Status of Claims

Claims 21-40 stand finally rejected by the Office Action mailed April 10, 2006 and are presently under appeal in this proceeding. No other claims stand rejected, allowed, withdrawn, objected to, or canceled.

## Status of Amendments

No amendment has been filed subsequent to the final Office Action mailed April 10, 2006.

## Summary of Claimed Subject Matter

### Independent Claim 21

Referring to Figures 2-4, independent claim 21 recites a high temperature thermal barrier coating 25 material for a turbine component, comprising:

a three-dimensional array 40 (see e.g. page 9 line 27 – page 10 line 3) of generally contacting ceramic geometric shapes 50 (see e.g. page 8 lines 30-34) having a packing density of 20% to 85%, (see e.g. page 8 lines 20-26), the ceramic shapes 50 having a wall structure density of 70% to 100% (see e.g. page 15 lines 10-15) and a wall thickness of 50 to 500 micrometers (see e.g. page 13 lines 11-21); and

a binder 56 disposed within the array 40 and among the ceramic shapes 50 to bind the ceramic shapes 50 together within the array 40, (see e.g. page 19 line 3 – page 20 line 12)

wherein the thermal barrier coating material is thermally stable at temperatures up to 1600°C. (see e.g. page 5 lines 6-12)

Independent Claim 33

Referring to Figures 2-4, independent claim 33 recites a high temperature material system 60 for a turbine component, comprising:

a three-dimensional array 40 (see e.g. page 9 line 27 – page 10 line 3) of generally contacting ceramic geometric shapes 50 (see e.g. page 8 lines 30-34) having a packing density of 20% to 85% (see e.g. page 8 lines 20-26), the ceramic shapes 50 having a wall structure density of 70% to 100% (see e.g. page 15 lines 10-15) and a wall thickness of 50 to 500 micrometers (see e.g. page 13 lines 11-21); and

a filler (see e.g. lines 6-15) disposed within the array 40 and among the ceramic shapes 50 to interconnect the ceramic shapes 50 within the array 40, (see e.g. page 19 line 3 – page 20 line 12)

wherein the material system 60 is thermally stable at temperatures up to 1600°C. (see e.g. page 5 lines 6-12)

Independent Claim 39

Referring to Figures 2-4, independent claim 39 recites a high temperature resistant turbine component (see e.g. page 1 lines 11-14), comprising:

a component selected from the group consisting of: blade 12, vane 14, transition (see e.g. page 8 lines 26-29), combustor (see e.g. page 8 lines 26-29), and seal 20, 22; and

a high temperature coating 25 applied to the component, the coating 25 comprising:

a three-dimensional array 40 (see e.g. page 9 line 27 – page 10 line 3) of generally contacting ceramic geometric shapes 50 (see e.g. page 8 lines 30-34) having a packing density of

20% to 85% (see e.g. page 8 lines 20-26), the ceramic shapes 50 having a wall structure density of 70% to 100% (see e.g. page 15 lines 10-15) and a wall thickness of 50 to 500 micrometers (see e.g. page 13 lines 11-21); and

a binder 56 or filler (see e.g. lines 6-15) disposed within the array 40 and among the ceramic shapes 40 to bind or interconnect the ceramic shapes 50 together within the array 40. (see e.g. page 19 line 3 – page 20 line 12)

Grounds for Rejection to be Reviewed

Whether claims 21-40, particularly independent claims 21, 33 and 39, are unpatentable under 35 U.S.C. § 102(e) as being anticipated by Morrison (USPN 6,197,424). Specifically, if Morrison discloses a three-dimensional array of generally contacting shapes having a packing density of 20% to 85% and a wall structure density of 70% to 100%.

Appellants' Argument

Applicants filed a second RCE on October 18, 2005 to overcome the then-outstanding Section 102 and 103 rejections under Kamo (USPN 5,820,976). In the next Office Action mailed April 10, 2006, the Examiner withdrew the Kamo rejections, imposed a "new" Section 102(e) rejection under Morrison, and made that rejection final.

However, the "new" final Section 102(e) rejection is actually the same rejection that was originally made in connection with the first Office Action mailed May 4, 2001 (parent case serial number 10/648,922 now USPN 6,641,907). In that May 4, 2001 Office Action, Examiner Pittman read Morrison as disclosing a material system having a wall structure density of 70% to 100%. Examiner Pittman based this reading on the understanding that "it appears that the material of the prior art is the same as instantly disclosed in the claim, therefore the material would inherently have the same properties as the instantly claimed properties."

Applicants' response to Examiner Pittman's Office Action, filed September 4, 2001, explained that while materials of Applicants' claimed material system might overlap with

materials of Morrison, Morrison is silent as to certain arrangements and/or constructions of the material that Applicants claim. For example, the claimed 70% to 100% wall structure density. As Applicants' explained in the Background of the Invention section of the application:

> Both U.S. Patent Application Serial Nos. 09/049,369 [] and 09/049,328 [] teach ceramic insulating coatings with improved erosion resistance and macroscopic closed porosity, utilizing hollow oxide-based spheres which can contact at least 3 or 4 other hollow spheres to provide improved dimensional stability at temperatures up to about 1600°C. [] However, none of these coatings or seal structures have optimized abradability with erosion resistance and insulating capability, minimized shrinkability and thermal mismatch, provided constrained stabilized uniform spherical porosity and adequate flexibility, and optimized thermal stability. Page 4, lines 1-17.

As Applicants further explained in the Summary of the Invention section of the application, the dense wall formation provides a material that is generally tougher than that of the prior art. Page 6, lines 5-11.

Based on this response, Examiner Pittman withdrew the Section 102(e) rejection in the next Office Action mailed December 5, 2001.

Now, Examiner Johnson in the pending final Office Action argues unpatentablity for the same reason that Applicants previously overcame (that Morrison inherently teaches 70% to 100% wall structure density) and for an additional similar reason (that Morrison inherently teaches a 20% to 85% packing density).

In response, Applicants respectfully submit that the claimed packing density and wall structure are not functional language, but rather a basic structural element of the claim. "A functional limitation is an attempt to define something by what it does, rather than by what it is (e.g. as evidenced by its specific structure or specific ingredients)." MPEP 2173.05(g). These limitations clearly recite specific structure and not function. Applicants also respectfully submit that if it is determined that the limitations are considered function, then their earlier successful arguments made in response to Examiner Pittman's Office Action mailed May 4, 2001 and

provided above sufficiently evidence that Morrison does not possess the purported characteristics that Examiner Johnson relies upon.

Applicants also submit the accompanying terminal disclaimer in accordance with 37 C.F.R. § 1.321(b) and 3.73(b) in order to overcome the double patenting rejection first made in the final Office Action.

F. Conclusion

For the foregoing reasons, Applicants respectfully submit that the rejections set forth in the final Office Action are inapplicable to the pending claims. The honorable Board is therefore respectfully requested to reverse the final rejection of the Examiner and to remand the application to the Examiner with instructions to allows the pending claims. Please grant any extensions of time required to enter this paper. Please charge any appropriate fees due in connection with this paper or credit any overpayments to Deposit Account No. 19-2179.

Respectfully submitted,

Dated: 5/26/06

By: _____

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Claims Appendix

21. (original) A high temperature thermal barrier coating material for a turbine component, comprising:

a three-dimensional array of generally contacting ceramic geometric shapes having a packing density of 20% to 85%, the ceramic shapes having a wall structure density of 70% to 100% and a wall thickness of 50 to 500 micrometers; and

a binder disposed within the array and among the ceramic shapes to bind the ceramic shapes together within the array,

wherein the thermal barrier coating material is thermally stable at temperatures up to 1600°C.

22. (original) The coating material of claim 21, wherein the turbine component is selected from the group consisting of: blade, vane, transition, combustor, and seal.

23. (original) The coating material of claim 21, wherein the turbine component is in a combustion turbine assembly.

24. (original) The coating material of claim 21, wherein the packing density is 35 to 65%.

25. (original) The coating material of claim 21, wherein the wall structure density is 85% to 100%.

26. (original) The coating material of claim 21, wherein the wall thickness is 100 to 400 micrometers.

27. (original) The coating material of claim 21, wherein the geometric shapes have an aspect ratio of less than 5-to-1.

28. (original) The coating material of claim 21, wherein the geometric shapes are spherical.

29. (previously presented) The coating material of claim 28, wherein the wall-thickness-to-radius ratio is 0.05 to 0.5 and the spheres are hollow.

30. (original) The coating material of claim 21, wherein the binder is ceramic.

31. (original) The coating material of claim 30, wherein the ceramic binder is less dense than the ceramic shapes.

32. (original) The coating material of claim 21, wherein the binder physically adheres to the ceramic shapes to bind the ceramic shapes together within the array.

33. (previously presented) A high temperature material system adapted for use on a turbine component, comprising:

a three-dimensional array of generally contacting ceramic geometric shapes having a packing density of 20% to 85%, the ceramic shapes having a wall structure density of 70% to 100% and a wall thickness of 50 to 500 micrometers; and

a filler disposed within the array and among the ceramic shapes to interconnect the ceramic shapes within the array,

wherein the material system is thermally stable at temperatures up to 1600°C.

34. (original) The material system of claim 33, wherein the turbine component is selected from the group consisting of: blade, vane, transition, combustor, and seal.

35. (original) The coating material of claim 33, wherein the turbine component is in a combustion turbine assembly.

36. (original) The coating material of claim 33, wherein the filler is ceramic.

37. (original) The coating material of claim 36, wherein the ceramic filler is less dense than the ceramic shapes.

38. (original) The coating material of claim 33, wherein the filler physically compresses the ceramic shapes to bind the ceramic shapes together within the array.

39. (previously presented) A high temperature resistant turbine component, comprising:

a component selected from the group consisting of: blade, vane, transition, combustor, and seal; and

a high temperature coating applied to the component, the coating comprising:

a three-dimensional array of generally contacting ceramic geometric shapes having a packing density of 20% to 85%, the ceramic shapes having a wall structure density of 70% to 100% and a wall thickness of 50 to 500 micrometers; and

a binder or filler disposed within the array and among the ceramic shapes to bind or interconnect the ceramic shapes together within the array.

40. (original) The turbine component of claim 38, wherein the coating covers the entire surface of the component.

## Evidence Appendix

None